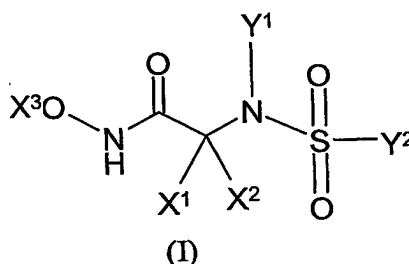


CLAIMS.

1. An imaging agent which comprises a metalloproteinase inhibitor of Formula (I)  
 5 labelled with an imaging moiety, wherein the imaging moiety can be detected following administration of said labelled matrix metalloproteinase inhibitor to the mammalian body *in vivo*:



where:

- 10  $Y^1$  is H or  $-(CH_2)_w-(C=O)-Z$ ; where w is an integer of value 1 to 6; and  
 Z is OH,  $C_{1-6}$  alkoxy,  $C_{4-10}$  aryloxy or  $NR^1R^2$  wherein  $R^1$  and  $R^2$  are each independently selected from the group consisting of H,  $C_{1-6}$  alkyl,  $C_{3-6}$  cycloalkyl,  $C_{1-6}$  fluoroalkyl or  $C_{4-10}$  aryl.

- 15  $X^1$  and  $X^2$  together with the carbon atom to which they are attached, form a  $C_{3-10}$  saturated ring which may be alicyclic or bicyclic, and may optionally incorporate 1 or 2 heteroatoms chosen from O, N and S;

$X^3$  is H,  $C_{1-3}$  alkyl or  $C_{1-3}$  fluoroalkyl;

- 20  $Y^2$  is a group of formula  $-[A^1]_p[O]_qA^2$  where p and q are 0 or 1, and  $A^1$  is  $C_{1-10}$  alkylene,  $C_{3-8}$  cycloalkylene,  $C_{1-10}$  perfluoroalkylene,  $C_{6-10}$  arylene or  $C_{2-10}$  heteroarylene, and  $A^2$  is H,  $C_{1-10}$  alkyl,  $C_{3-8}$  cycloalkyl,  $C_{1-10}$  perfluoroalkyl,  $C_{6-10}$  aryl or  $C_{2-10}$  heteroaryl, with the proviso that when  $p=0$ , q is also 0 and  $A^2$  is not H.

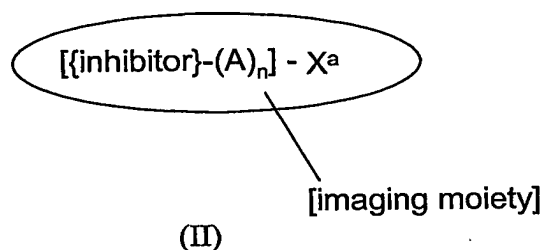
- 25 2. The imaging agent of Claim 1, where  $Y^1$  is  $-(CH_2)_w-(C=O)-Z$  and w is 1, 2 or 3.  
 3. The imaging agent of Claims 1 or 2, where  $X^3$  is H,  $CH_3$  or  $CH_2F$ .

4. The imaging agent of claims 1 to 3, wherein  $Y^2$  is  $-C_6H_4-O-A^2$ , and  $A^2$  is  $C_{6-10}$  aryl.

5. The imaging agent of Claims 1 to 4, where the imaging moiety is chosen from:

- (i) a radioactive metal ion;
- (ii) a paramagnetic metal ion;
- (iii) a gamma-emitting radioactive halogen;
- (iv) a positron-emitting radioactive non-metal;
- (v) a hyperpolarised NMR-active nucleus;
- (vi) a reporter suitable for *in vivo* optical imaging;
- (vii) a  $\beta$ -emitter suitable for intravascular detection.

6. The imaging agent of Claims 1 to 5, where the imaging agent is of Formula II:



where:

{inhibitor} is the metalloproteinase inhibitor of Formula (I);

$-(A)_n$  is a linker group wherein each A is independently  $-CR_2-$ ,  $-$

$CR=CR-$ ,  $-C\equiv C-$ ,  $-CR_2CO_2-$ ,  $-CO_2CR_2-$ ,  $-NR_2CO-$ ,  $-CONR-$ ,  $-$

$NR(C=O)NR-$ ,  $-NR(C=S)NR-$ ,  $-SO_2NR-$ ,  $-NRSO_2-$ ,  $-CR_2OCR_2-$ ,  $-$

$-CR_2SCR_2-$ ,  $-CR_2NR_2CR_2-$ , a  $C_{4-8}$  cycloheteroalkylene group, a  $C_{4-8}$  cycloalkylene group, a  $C_{5-12}$  arylene group, or a  $C_{3-12}$  heteroarylene group, an amino acid, a sugar or a monodisperse polyethyleneglycol (PEG) building block;

R is independently chosen from H,  $C_{1-4}$  alkyl,  $C_{2-4}$  alkenyl,  $C_{2-4}$  alkynyl,  $C_{1-4}$  alkoxyalkyl or  $C_{1-4}$  hydroxyalkyl;

n is an integer of value 0 to 10; and

and  $X^a$  is H, OH, Hal,  $NH_2$ ,  $C_{1-4}$  alkyl,  $C_{1-4}$  alkoxy,  $C_{1-4}$  alkoxyalkyl,  $C_{1-4}$  hydroxyalkyl or  $X^a$  is the imaging moiety.

7. The imaging agent of Claim 6, where the imaging moiety is attached at the Y<sup>1</sup> or Y<sup>2</sup> positions of the metalloproteinase inhibitor.

5 8. The imaging agent of Claims 1 to 7, where the matrix metalloproteinase inhibitor is conjugated to a ligand, and said ligand forms a metal complex with the radioactive metal ion or paramagnetic metal ion.

9. The imaging agent of Claim 8, where the ligand is a chelating agent.

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10. The imaging agent of Claims 8 or 9, where the radioactive metal ion is a gamma emitter or a positron emitter.

11. The imaging agent of Claim 10, where the radioactive metal ion is <sup>99m</sup>Tc, <sup>111</sup>In, <sup>64</sup>Cu, <sup>67</sup>Cu, <sup>67</sup>Ga or <sup>68</sup>Ga.

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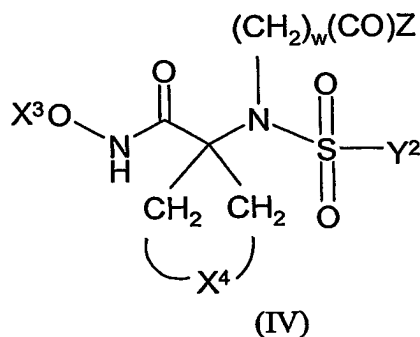
12. The imaging agent of Claim 10, where the gamma-emitting radioactive halogen imaging moiety is <sup>123</sup>I.

13. The imaging agent of Claim 10, where the positron-emitting radioactive non-metal is chosen from <sup>18</sup>F, <sup>11</sup>C or <sup>13</sup>N.

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14. The imaging agent of Claims 1 to 13, where the matrix metalloproteinase inhibitor is of Formula IV:

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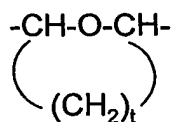


where:

Y<sup>2</sup>, w and Z are as defined in Claim 1;

$X^3$  is H,  $CH_3$  or  $CH_2F$ ;

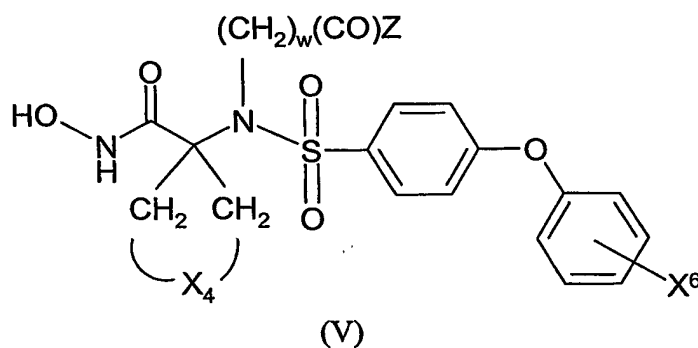
X<sup>4</sup> is  $-(\text{CH}_2)_m-$  where m is 1, 2 or 3,  $-\text{CH}_2\text{OCH}_2-$  or X<sup>5</sup> where X<sup>5</sup> is



where  $t$  is 2 or 3.

5 15. The imaging agent of Claim 14, where Z is  $\text{NR}^1\text{R}^2$ .

16. The imaging agent of Claims 14 or 15, where the matrix metalloproteinase inhibitor is of Formula V:



10 where:

X<sup>6</sup> is Hal, R<sup>1</sup> or OR<sup>1</sup>, where R<sup>1</sup> is C<sub>1-3</sub> alkyl or C<sub>1-3</sub> fluoroalkyl.

17. The imaging agent of Claim 16, where Z is  $\text{NR}^1\text{R}^2$ ,  $\text{X}^6$  is F; and  $\text{X}^4$  is  $-(\text{CH}_2)_2-$ ,  $-\text{CH}_2\text{OCH}_2-$  or  $\text{X}^5$  with t equal to 2.

15

18. A pharmaceutical composition which comprises the imaging agent of claims 1 to 17 together with a biocompatible carrier, in a form suitable for mammalian administration.

19. A radiopharmaceutical composition which comprises the imaging agent of claims 1 to 17 wherein the imaging moiety is radioactive, together with a biocompatible carrier, in a form suitable for mammalian administration.

20. The radiopharmaceutical composition of claim 19, where the imaging moiety comprises a radioactive metal ion.

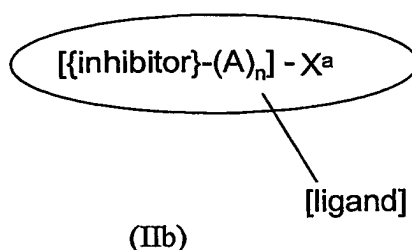
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21. The radiopharmaceutical composition of claim 19, where the imaging moiety comprises a positron-emitting radioactive non-metal or a gamma-emitting radioactive halogen.

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22. A conjugate of a matrix metalloproteinase inhibitor of Formula (I) as defined in Claim 1 with a ligand, wherein said ligand is capable of forming a metal complex with a radioactive or paramagnetic metal ion.

10 23. The conjugate of Claim 20, of Formula IIb:



where {inhibitor}, A, n and  $X^a$  are as defined in Claim 6.

15 24. The conjugate of Claims 22 or 23, wherein the matrix metalloproteinase inhibitor is of Formulae IV or V of Claims 14 to 17.

25. The conjugate of Claims 22 to 24, wherein the ligand is a chelating agent.

20 26. The conjugate of Claim 25, wherein the chelating agent has a diaminedioxime,  $N_2S_2$ , or  $N_3S$  donor set.

27. A kit for the preparation of the radiopharmaceutical composition of Claim 20, which comprises the conjugate of Claims 22 to 26.

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28. The kit of Claim 30, where the radioactive metal ion is  $^{99m}\text{Tc}$ , and the kit further comprises a biocompatible reductant.

29. A kit for the preparation of the radiopharmaceutical composition of Claim 21, which comprises a precursor, said precursor being a non-radioactive derivative of the matrix metalloproteinase inhibitor of claims 1 to 17, wherein said non-radioactive derivative is capable of reaction with a source of the positron-emitting radioactive non-metal or gamma-emitting radioactive halogen to give the desired radiopharmaceutical.
30. The kit of claim 29 where the precursor is in sterile, apyrogenic form.
31. The kit of Claims 29 or 30, where the source of the positron-emitting radioactive non-metal or gamma-emitting radioactive halogen is chosen from:
- (i) halide ion or  $F^+$  or  $I^+$ ; or
  - (ii) an alkylating agent chosen from an alkyl or fluoroalkyl halide, tosylate, triflate or mesylate.
32. The kit of Claims 29 to 31, where the non-radioactive derivative is chosen from:
- (i) an organometallic derivative such as a trialkylstannane or a trialkylsilane;
  - (ii) a derivative containing an alkyl halide, alkyl tosylate or alkyl mesylate for nucleophilic substitution;
  - (iii) a derivative containing an aromatic ring activated towards nucleophilic or electrophilic substitution;
  - (iv) a derivative containing a functional group which undergoes facile alkylation;
  - (v) a derivative which alkylates thiol-containing compounds to give a thioether-containing product.
33. The kit of claims 29 to 32, where the precursor is bound to a solid phase.
34. Use of the imaging agent of Claims 1 to 17 for the diagnostic imaging of atherosclerosis.
35. Use of the imaging agent of Claims 1 to 17 for the diagnostic imaging of unstable plaques.

36. Use of the imaging agent of Claims 1 to 17 for the intravascular detection of atherosclerosis.